

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.-7. (Cancelled)

8. (Currently amended) Apparatus for transferring chips from a wafer to a lead frame, comprising:

a wafer-positioning device for positioning a wafer with chips surfaces thereof extending in a first plane[[:]] having a front face and a back face, the chips surfaces exposed on the front face of the first plane;

a lead frame positioning device for positioning a lead frame with a bond surface thereof extending in a second plane which is ~~at a first angle of between 0° and 180° to~~ different from the first plane, the first plane and the second plane having a front face and a back face, the bond surface exposed on the front face of the second plane, the front face of the second plane facing the front face of the first plane, either parallel (180°) or intersecting at an intersection line to form a dihedral angle of greater than 0° and less than 180°;

~~at least one~~ a rotatable transfer assembly comprising at least two transfer heads for picking up a first chip from the wafer by ~~one of the~~ a first transfer heads head in a chip pick-up position, while bonding a second chip to the lead frame by another one of the transfer heads in a chip bonding position; ~~transferring~~ rotating the first chip by ~~said one of the~~ first transfer heads head from the chip pick-up position to the chip bonding position; and bonding the first chip [[on]] to the lead frame by said one of the first transfer heads head in the chip bonding position, while picking up a third chip from the wafer by another one of the transfer heads in the chip pick-up position[[:]]; and

Appln No. 10/561,397
Amdt date November 6, 2008
Reply to Office action of August 6, 2008

a transfer assembly motor for driving the rotatable transfer assembly about an axis of rotation ~~which extends in a third plane at half of first angle to the first plane and the second plane, respectively, and the axis of rotation extending at a second angle of at least 0° and at most 90° to said intersection line, the axis of rotation extending in a third plane, the third plane being both equidistant to and between the front faces of the first and second planes.~~

9. (Previously amended) Apparatus according to claim 8, characterized in that the transfer heads are rotatable essentially along one circle in a fourth plane at right angles to the axis of rotation of the transfer assembly.

10. (Previously amended) Apparatus according to claim 9, characterized in that the transfer heads are spaced regularly along said circle.

11. (Currently amended) Apparatus according to claim ~~[[8]]~~ 31, characterized in that the ~~first~~ dihedral angle is 90°.

12. (Currently amended) Apparatus according to claim ~~[[8]]~~ 31, characterized in that the ~~second~~ offset angle is 0°.

13. (Previously amended) Apparatus according to claim 8, characterized in that the number of transfer heads is four.

14. (Previously amended) Apparatus according to claim 8, characterized in that the transfer assembly is rotated in one direction.

15. (Previously amended) Apparatus according to claim 8, characterized in that each transfer head comprises a collet which, in the chip pick-up position, is movable in a direction

essentially at right angles to the first plane, and in the chip bonding position, is movable in a direction essentially at right angles to the second plane.

16. (Currently amended) Apparatus according to claim 15, characterized in that the transfer assembly comprises a counterweight for each collet, each collet being coupled to its corresponding counterweight through a mechanical coupling for compensating radial forces exerted on the collet relative to said axis of rotation.

17. (Previously amended) Apparatus according to claim 16, characterized in that the mechanical coupling is adapted to be driven by a collet drive motor for moving the collet radially relative to said axis of rotation.

18. (Previously amended) Apparatus according to claim 17, characterized in that the transfer assembly motor has the same axis of rotation as the collet drive motor.

19. (Previously amended) Apparatus according to claim 16, characterized in that the counterweight for one collet is another collet of the transfer assembly.

20. (Previously amended) Apparatus according to claim 19, characterized in that said one collet is situated oppositely relative to said other collet with respect to said axis of rotation.

21. (Previously amended) Apparatus according to claim 16, characterized in that the mechanical coupling is a wire.

22. (Previously amended) Apparatus according to claim 21, characterized in that a support of each collet relative to the transfer assembly comprises a pressure spring pretensioning the wire.

23. (Previously amended) Apparatus according to claim 22, characterized in that the pressure spring has a low stiffness.

24. (Previously amended) Apparatus according to claim 22, characterized in that the pretension force is greater than a bonding force to be applied on a chip on a lead frame by the collet of a transfer head.

25. (Previously amended) Apparatus according to claim 8, characterized in that the rotatable transfer assembly is rotatable around a transfer assembly stator, a narrow circumferential gap being provided between the rotatable transfer assembly and the transfer assembly stator, the transfer assembly stator comprising groove sections facing the gap for at least the chip pick-up position and the chip bonding position, respectively, each groove section extending in the circumferential direction and being in communication with a first gas duct, each transfer head of the rotatable transfer assembly comprising at least one collet having a pick-up opening, the pick-up opening being in communication with the gap through a second gas duct.

26. (Previously amended) Apparatus according to claim 25, characterized in that the number of groove sections is equal to the number of transfer heads.

27. (Previously amended) Apparatus according to claim 25, characterized in that each first duct is provided with a controllable valve.

28. (Previously amended) Apparatus according to claim 25, characterized in that the second gas duct at its end facing the gap is provided with a bridging groove extending in the circumferential direction, the bridging groove being adapted to bridge two adjacent groove sections of the transfer assembly stator.

29.–30. (Cancelled)

Appln No. 10/561,397

Amdt date November 6, 2008

Reply to Office action of August 6, 2008

31. (New) Apparatus according to claim 8, wherein the two front faces intersect at the intersection line, the third plane bisects the dihedral angle, and the axis of rotation is at an offset angle of at least 0° and at most 90° with respect to the intersection line.